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G07F

## (54) Gaming machines

(57) A gaming machine (2) has a display (28) for displaying a plurality of sets (30, 32, 34) of symbols. The symbols are displayed in winning combinations, and a win is achieved by a player by the selection of all the symbols of a winning combination. The machine initially selects some of the symbols on a random or pseudo-random basis. The machine is capable of selecting at least two symbols from at least one of the sets. The player is allowed to perform a nudging operation whereby the or each selected symbol in a set chosen by the user ceases to be selected, and an adjacent symbol is selected instead. The game is an ancillary feature brought into operation on random or pseudo-random occasions during the playing of a sequence of main games using spinning reels (10).

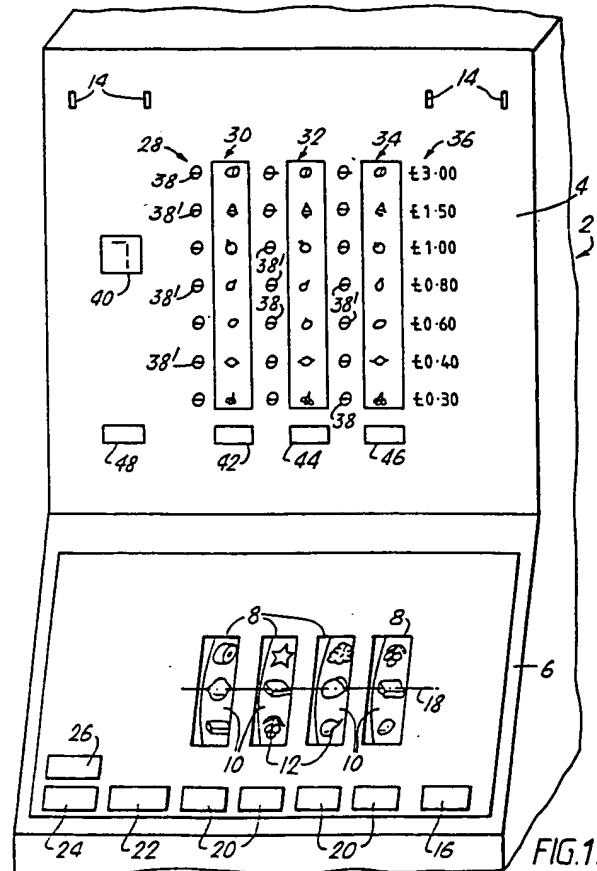
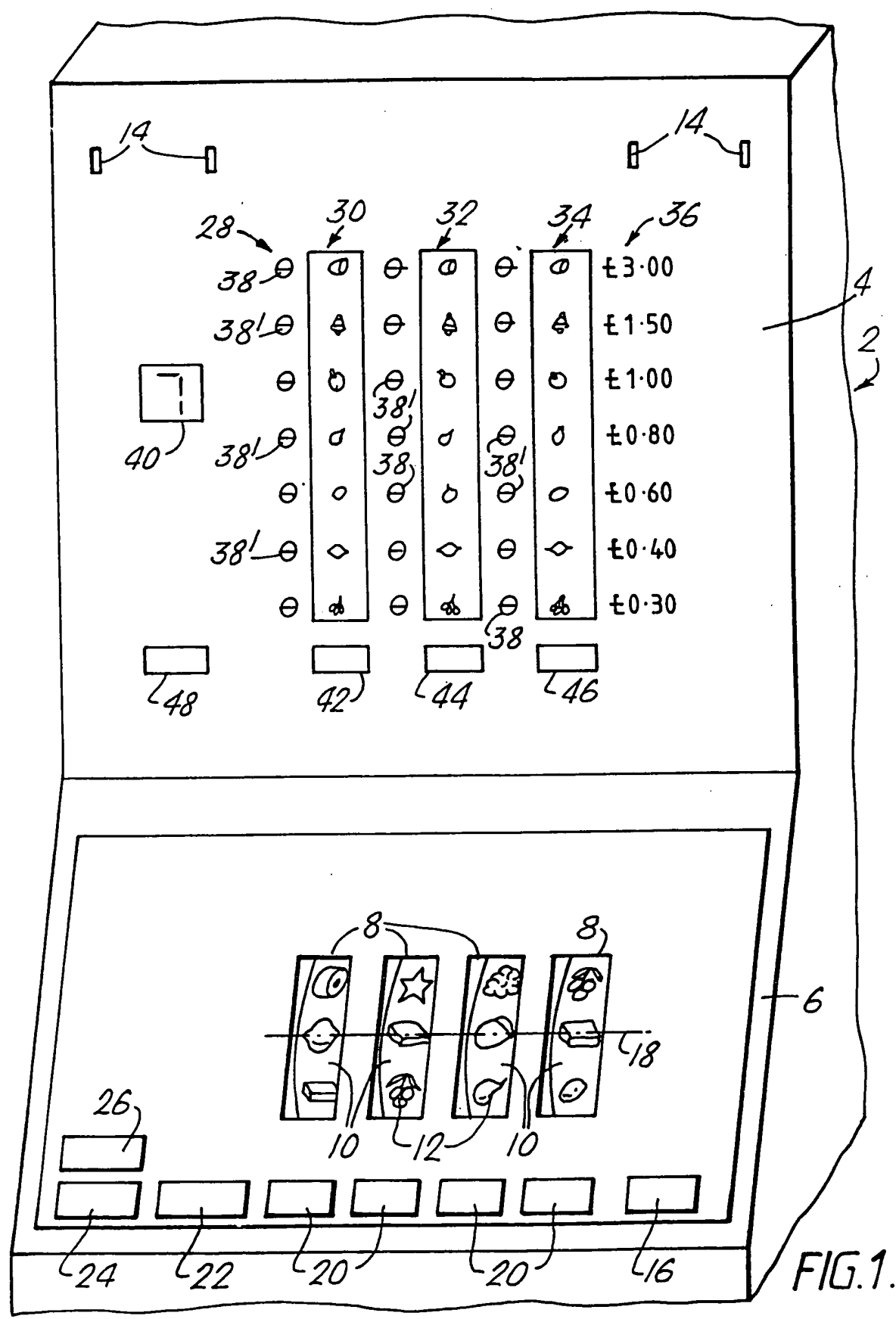


FIG.1.



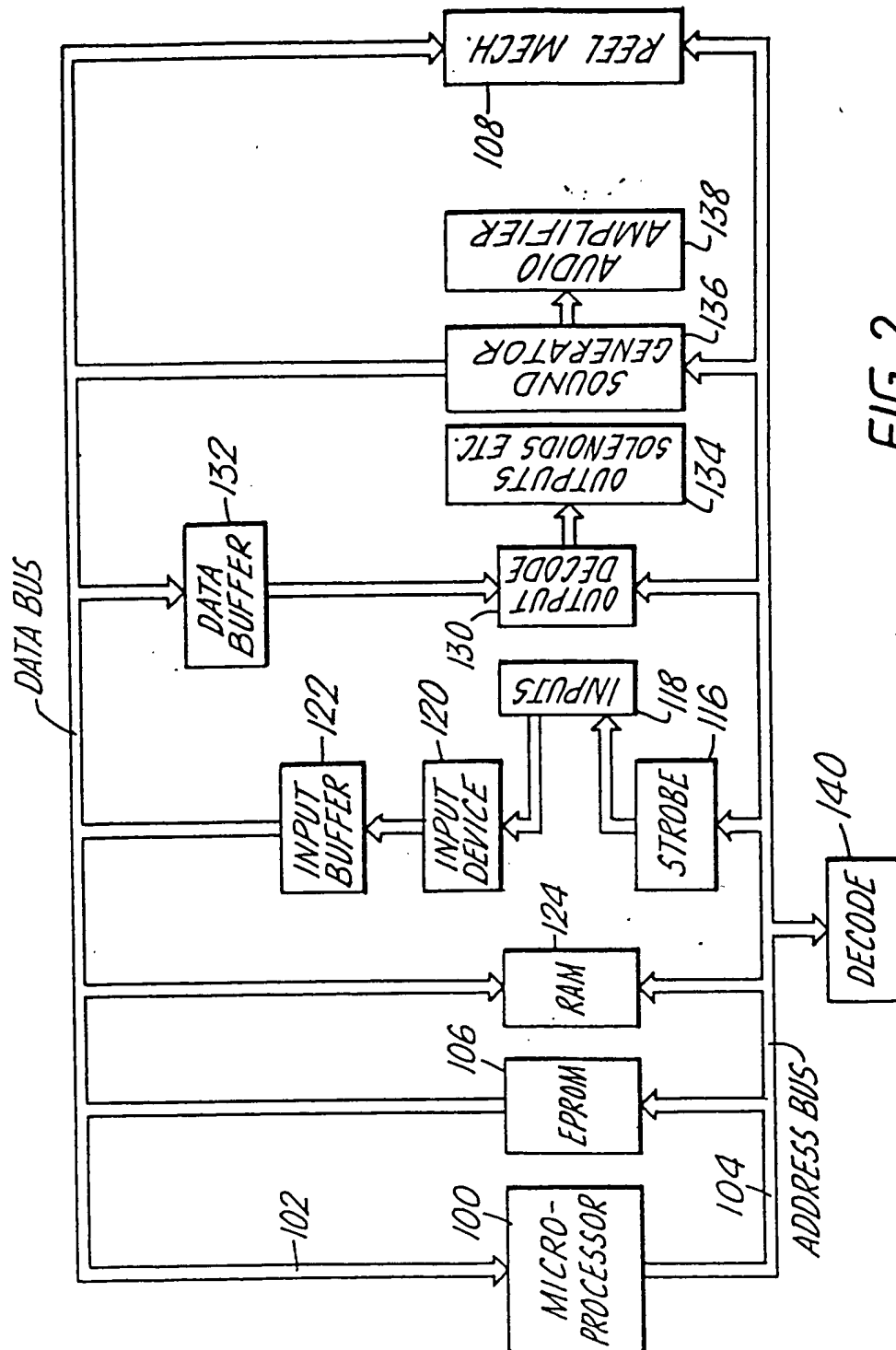


FIG. 2.

## SPECIFICATION

## Gaming machines

5 This invention relates to gaming machines, which term is used herein to refer to any device by means of which a user can play a game and, depending upon the results of the game, obtain a credit value. The machine preferably pays out cash and/or tokens in an amount corresponding to the credit value.

10 In the art, those machines which pay out only cash are referred to as "gaming machines". Herein, however, the term gaming machine is used in a generic sense, as the invention is applicable also to other types of machines such as those known as "amusement with prize" machines, which pay out both cash and tokens. The invention is particularly but not exclusively applicable to machines known as "fruit machines", which incorporate symbol-carrying reels which are spun during the playing of a game so as to alter in a random or pseudo-random manner the combination of symbols which can be viewed by the user. The invention is also applicable to machines which incorporate other forms of display, such as a panel carrying symbols which are selectively illuminated during the playing of a game, or a video display screen which displays simulated reels or other symbols such as playing cards. Patent Specification GB-A-2,117,155, for example, describes a machine to which the present invention can be applied.

Generally, when playing these types of machines, a game can result in any of several different types of winning result, and a credit value accorded to the user on achieving a win depends upon which of the types of winning result he has achieved.

It would be desirable to provide a gaming machine which is of enhanced attractiveness to a potential player, so as to increase the use of the machine.

In accordance with one aspect of the present invention there is provided a gaming machine having means for displaying two or more sets of symbols, the symbols being displayed in winning combinations each formed of symbols from respective sets, the machine being operable to select a number of the displayed symbols including at least two symbols from one of the sets, and being arranged to allow a user at least partial control in the selection of at least one of the symbols in an attempt to cause all the symbols of at least one of the winning combinations to be selected.

In accordance with another aspect of the invention, a gaming machine is operable to select symbols from a plurality of sets thereof, and to award a win to a player if the selected symbols include a winning combination formed of symbols from respective sets, wherein the machine is operable to select a random or pseudo-random number of symbols from at least one of the sets and at least one symbol from a different set, and is arranged to allow the player at least partial control over the selection of at least one of the symbols in an attempt to achieve a winning combination.

In accordance with a still further aspect of the invention, a gaming machine is operable to display two or more sets of symbols, and is operable to se-

lect a plurality of symbols therefrom, the machine being capable of selecting any or all of the symbols from at least one of the sets, and being arranged to allow the user at least partial control over the selection of at least one of the symbols whereby the user can attempt to cause selection of a winning combination formed of symbols from respective sets.

In accordance with another aspect of the invention, a gaming machine is operable to select particular symbols from a plurality of sets of sequentially-arranged symbols, and to indicate to a user the selected symbols, the machine being capable of selecting at least two symbols from at least one of the sets, the relative position of the symbols within the respective set being variable in dependence upon which of the symbols have been selected, wherein the user has at least partial control over the selection of at least one of the symbols so that an attempt can be made by the user to cause selection of a winning combination of selected symbols from respective sets.

In accordance with yet another aspect of the invention, a gaming machine is operable to display a plurality of sets of symbols and to select therefrom particular symbols including at least two symbols from at least one of the sets, the machine being operable to indicate the selected symbols to a player and to permit the player to alter the selection in an attempt to cause a combination of aligned symbols from respective sets to be selected in place of a previous selection of non-aligned symbols.

In accordance with a still further aspect of the invention, a gaming machine is operable to display a plurality of sets of symbols at respective locations, to indicate particular selected locations to be potential winning locations, including at least two locations occupied by symbols of one of the sets, and then to alter the relationship between the selected locations and the symbols displayed thereat, under at least partial control of the user, whereby the user can attempt to cause symbols of different sets displayed at selected locations to form a winning combination. Preferably, the alteration is achieved by selecting different locations in place of those initially selected, although instead it could be achieved by altering the symbols at the selected locations.

In accordance with another aspect of the invention, a gaming machine is operable to award a player with a win if, following a selection operation, a winning combination of symbols from respective sets is aligned with a win line, wherein the number of win lines and their locations may vary.

It will be appreciated that the invention provides in effect a game which can be played by the user. This may be the main game provided by the machine, but preferably it is an ancillary game which is occasionally brought into action (e.g. on random or pseudo-random occasions) as a bonus awarded during the course of playing a main game, which preferably involves the spinning of mechanical or simulated reels.

In one preferred arrangement embodying these aspects of the invention, a gaming machine has a panel on which is displayed (preferably fixedly) a number of columns (or rows) of symbols. The machine is capable of selecting a number of the displayed symbols, and of indicating the selected sym-

bolis to the user e.g. by illuminating either the symbols or indicators adjacent thereto. The user is given partial control over the selection of symbols by virtue of the fact that once the machine has performed an initial selection, the user is allowed a limited degree of adjustment of the selected symbols.

Preferably, this is achieved by the player operating means which causes one symbol no longer to be selected, and instead a different symbol in the same set and adjacent to the previously-selected symbol to be selected. This is therefore analogous to the "nudging" feature commonly found in conventional fruit machines. Preferably, the nudging operation is carried out separately for each set of symbols, and if two or more symbols have been selected within the same set, a single nudging operation preferably affects all the selected symbols in the set. There is preferably a limit to the number of nudging operations which the user can perform, or a limit to the time in which he can perform nudging operations.

It is to be noted that such an arrangement differs substantially from the "nudging" feature commonly found in fruit machines, and provides different attractions to the player. The selection of two or more symbols from one of the sets effectively defines a number of different positions or "win lines" to which the user's attention can be directed when performing nudging operations on the other sets of symbols. These positions or win lines themselves vary either during the course of a particular game, because a nudging operation has been performed on the set containing the plurality of selected symbols, or from game to game, whereupon the initial selection of symbols by the machine will differ. In addition, it is possible that the initial selection of symbols by the machine will result in more than one of the sets containing more than one selected symbol, so that the number of ways in which winning combinations can be achieved is substantially increased.

A winning combination of symbols preferably results in the player being awarded a credit value (although alternatively it could be arranged to provide some other advantageous feature). Preferably, different winning combinations give rise to different credit awards. This adds to the player's interest when he is selecting which of the different routes he can choose in order to achieve a winning combination.

The game may cease when the player has first achieved a winning combination, but preferably allows the player to continue so that repeated wins are possible. This means that the way the player operates the machine will greatly influence his winnings.

An arrangement embodying the invention will now be described by way of example with reference to the accompanying drawings, in which:

*Figure 1* shows a gaming machine in accordance with the invention, and

*Figure 2* is a block diagram of the circuitry of the machine.

The specific embodiment to be described is a version of the well-known "fruit machine". Many examples of such machines are readily available, and the way in which they operate is well-known to those familiar with the art.

Referring to *Figure 1*, the machine 2 has a vertical facia or panel 4 and an inclined facia or panel 6. The facia 6 has four apertures 8, which reveal portions of the circumferences of four reels 10 which are mounted for rotation about a common horizontal axis. The reels carry symbols such as those shown at 12 on their peripheries, some of the symbols being visible through the apertures 8.

The machine can be played by inserting a coin or a token through an appropriate one of several slots 14.

After the user has inserted a coin or token, a game may be started. This is achieved by pressing a start button 16. This causes the four reels 10 to spin, which is preferably achieved by using a stepper motor for each reel. The reels then stop spinning, their final positions being determined in a random or pseudo-random manner. If the reels are positioned such that certain symbols are aligned along a win line 18, the user is credited with a win value, which in this machine results in the paying out of coins in an amount corresponding to the win value.

Occasionally, a "hold" feature is provided whereby the user is given the opportunity to press one or more hold buttons 20, which will prevent, during the subsequent reel-spinning operation, the spinning of each reel associated with a hold button which has been pressed. There is a cancel button 22 for cancelling the selection of reels using the hold buttons to permit a different selection before the reel-spinning operation.

A "gamble" feature is provided each time the user obtains a winning result, whereby the user can choose either to collect his winnings by pressing a collect button 24 or to enter a gamble mode, as a result of which his win value may be increased or decreased, by pressing a gamble button 26.

The operation of the machine as described so far is conventional.

The vertical panel 4 of the machine 2 has a display area indicated generally at 28 which fixedly displays three sets of symbols in respective columns 30, 32 and 34. Each symbol is aligned with symbols in the other columns, whereby a plurality of (in this case seven) horizontal rows of symbols are formed. Each row represents a winning combination of symbols. A respective value is attributed to each of the winning combinations of symbols, and this value is indicated at the right-hand side of the combination as shown at 36.

The panel 4 has indicators such as those shown at 38, each disposed at the left-hand side of a respective symbol. When the respective symbol has been selected, the associated indicator is illuminated by energising a lamp disposed behind the front panel 4. Illuminated symbols are indicated at 38'.

The panel 4 is also provided with a numeric display 40, push buttons 42, 44 and 46 associated respectively with the columns 30, 32 and 34, and a further push button 48, which are used in a player-controlled nudging operation as will be described.

The game is played as a conventional machine until a special bonus feature becomes available, which can be indicated to the user by the flashing of a light (not shown). The awarding of the bonus feature may occur on random or pseudo-random occasions,

and may if desired be dependent upon whether a particular symbol is displayed by the reels following their spinning during the course of a normal game.

Although it is envisaged that the bonus feature comes into play following the playing of the main game, it could alternatively take place before or during a game.

Once the bonus feature comes into play, the machine makes a random or pseudo-random selection from the three sets of symbols 30, 32 and 34, and indicates the selected symbols by illuminating the respective indicators 38. If desired, the selection of symbols could be dependent upon the symbols displayed by the reels 10.

The machine also calculates randomly or pseudo-randomly a maximum number of permitted nudges, which is then displayed by the display 40.

The user may then press any one of the buttons 42, 44 and 46 either alone or simultaneously with the button 48. The former case signifies a nudge down operation on the respective set of symbols, whereas the latter signifies a nudge up operation. A nudge down operation causes each illuminated symbol 38' in the associated column to cease to be illuminated, and the downwardly adjacent indicator 38 to commence to be illuminated. In other words, downwardly-adjacent symbols are selected in place of the formerly selected symbols. Correspondingly, a nudge up operation results in upwardly-adjacent symbols being selected in place of the formerly selected symbols.

The aim of the user in operating the buttons 42, 44, 46 and 48 is to cause the indicators associated with a complete horizontal row of symbols to be illuminated, whereupon the credit value associated with that row is awarded to the user. The user can then proceed to operate the buttons 42, 44, 46 and 48 to obtain an award associated with a different row. (In an alternative embodiment, the bonus feature ceases when a player first achieves the selection of a winning combination.) Each time one of the buttons 42, 44 and 46 is pressed, the number displayed by the display 40 is decremented. Once that number reaches zero, no more nudging operations are permitted.

In the present embodiment there are seven different winning combinations, and each is associated with a different win value. Because nudge up and nudge down operations can be carried out on each of the sets of symbols, and at least one and preferably more than one of the sets has (at least on certain occasions) two or more symbols selected therefrom, there are many different ways in which the user can operate the machine during the bonus feature and many different ways in which wins can be achieved. Accordingly, a user will attempt to develop skills in operating the machine in order to maximise the wins, which thereby increases user interest.

If desired, the machine can be arranged to award extra wins if only the two left-most symbols of a horizontal row are selected. In the preferred embodiment, this feature is provided and the amount of the win is constant irrespective of which of the horizontal rows contains the two selected symbols.

At the commencement of the bonus feature the three symbols of a single horizontal row may initially

be selected by the machine. The machine can be arranged automatically to award the player with the win value associated with a combination initially selected by the machine, or alternatively can be arranged so that only combinations won as a result of the user operating the nudge buttons 42, 44, 46 and 48 are awarded.

Referring to Figure 2, the operation of the machine 2 is under the control of a microprocessor 100 connected to data and address buses 102 and 104, respectively. The way in which the microprocessor 100 operates is determined by a program stored in a non-volatile memory 106, such as an EPROM, connected to the data and address buses 102 and 104.

The data and address buses 102 and 104 are also connected to a reel mechanism 108, which incorporates the reels 10 referred to above.

By applying appropriate addresses on the address bus 104, and by transmitting appropriate data on the data bus 102, the microprocessor 100 can control the number of pulses delivered to the driver motors of each of the reels and thereby cause the reels to rotate by a predetermined amount. Also the positions of the reels can be determined by data delivered to the data bus 102 by the reel mechanism 108.

The address bus 104 is connected to a device 116 for strobing the inputs 118 of the machine 2. The inputs 118 include the above-mentioned switches 16, 20, 22, 24, 26, 42, 44, 46 and 48, and connections to a coin and token validator which generates signals indicating the value of inserted coins and tokens.

Upon actuation of one of the inputs 118, an input device 120 delivers, via an input buffer 122, data to the bus 102 to indicate to the microprocessor 100 that a switch has been actuated or a coin or token has been inserted.

A random access memory 124 coupled to the address buses 102 and 104 is operable, during use, to store such information as the positions of the reels 10 and the amount of accumulated credit.

An output decode device 130 is coupled to the address bus 104 and transmits data received from the address bus 102 via a data buffer 132 to output device 134, including solenoids which are actuated to dispense coins and tokens, lamps on the machine to indicate different modes of operation, the lamps used for illuminating the indicators 38, and the circuit used to drive the digital display 40.

A sound generator 136 is coupled to the buses 102 and 104 so that the microprocessor can cause the generator to generate audio signals which are delivered to an amplifier 138 and then to a speaker (not shown).

An address decoder 140 is coupled to the address bus 104, and is arranged to enable the devices selected by the microprocessor 100 for transmission or reception of data by means of enable lines (not shown).

Numerous features can be added, and modifications made, to the embodiment described above.

Some of these are set out below:

1. In the above embodiment, the initial selection of symbols is carried out at the commencement of the bonus feature, the selected symbols then being indicated to the user by illuminating the corresponding indicators 38. Instead, the selection of the symbols

can be carried out progressively, over the course of several games played by the spinning of the reels 10. The symbols selected may be dependent upon those displayed by the reels once they have stopped spinning. For example, some of the symbols 12 on the three left-most reels 10 may have superimposed thereon further, "bonus" symbols. If any of these is displayed on the win line 18 following the spinning of the reels, the corresponding symbol in the corresponding one of the columns 30, 32 and 34 is selected. As successive games are played, the number of symbols selected increases so that the bonus feature becomes gradually more valuable and the user consequently has more incentive to continue playing.

2. As described above, the symbols in columns 30, 32 and 34 are fixed, and arranged in winning combinations. The player may cause the illumination of the corresponding indicators 38 to alter in order to achieve selection of all symbols of a winning combination. Instead, the illumination of the indicators 38 can remain constant, and the images of the symbols in the appropriate column 30, 32 and 34 shifted accordingly. One way of achieving this would be for the machine to select randomly or pseudo-randomly complete rows of symbols instead of individual symbols, the user then being able to nudge each symbol column individually to alter the symbol combination on each selected row or "win line" to try to achieve a winning combination. Such an embodiment (which would require only a single indicator 38 for each row) would still have the advantageous variety of an indeterminate number of win lines located at indefinite positions. The machine may be provided with means capable of displaying electrically alterable symbols, e.g. a video display, to facilitate displaying symbols which give the appearance of shifting.

3. The machine may provide a "wrap-around" feature whereby performing a nudge down operation on a set of symbols wherein the lowermost symbol has been selected causes the uppermost symbol to be selected, and performing a nudge up operation on a set wherein the uppermost symbol has been selected causes the lowermost symbol to be selected. Correspondingly, if the symbols rather than the illuminated indicators are nudged, nudging down causes the lowermost symbol to be placed at the uppermost location and nudging up causes the uppermost symbol to be placed at the lowermost location.

4. In the above embodiment, the player is given limited control over symbol selection from all the displayed sets by using a nudging facility. Alternative arrangements are possible. For example, the player may be limited in his choice of which of the sets to nudge (e.g. he may be permitted to nudge only the central set, in which case it is preferred that the machine be capable of selecting a plurality of symbols from each of the other sets). Player-control may be achieved without using a nudging facility. The machine may be arranged to select symbols of one or more sets in sequence, the player being able to halt this sequential selection, following which the machine provides an award in dependence on which symbols are selected at the point at which the player halted the operation. One particularly convenient

way of achieving this is for the indicators 38 of a particular column to be illuminated in turn, one after the other, starting from the top (or bottom) to simulate one or more falling (or rising) balls. The player attempts to halt a "ball" at what he feels is an advantageous position. This can be carried out in turn for each of the other columns, or the machine can select symbols from the other columns independently of the player.

5. The machine may be provided with a feature whereby the user can gamble the number of permitted nudges displayed by the display 40. For example, once the bonus feature becomes available, the user may be permitted to operate the gamble button 26, and the machine will then increase or decrease the number of permitted nudges on a random or pseudo-random basis.

6. The machine may be arranged so as to provide a credit award if a single, predetermined one of the symbols on the panel 4 is selected, rather than always requiring a combination of symbols to be selected.

7. The machine may have an automatic facility whereby adjustment of the selected symbols to achieve the most favourable winning combination is performed automatically, preferably but not necessarily in response to the user actuating a means provided to permit selection of this automatic operation.

## CLAIMS

1. A gaming machine which can display two or more sets of symbols, and which permits a user to play a game by enabling the user at least partial control in making selections from the symbols so that the player can attempt to achieve the selection of a winning combination formed by symbols from respective sets, wherein the machine is capable of allowing of any two, at least, of the symbols from at least one of the sets to be simultaneously selected.

2. A machine as claimed in claim 1, wherein the machine is capable of allowing simultaneous selection of any two, at least, of the symbols from each of the sets.

3. A machine as claimed in claim 1 or 2, wherein the machine displays the symbols in winning combinations, the symbols of each combination being aligned, and wherein the player is allowed at least partial control in making the selection so that he may attempt to cause a selected symbol from one of the sets to be aligned with a selected symbol from the or each of the other sets.

4. A machine as claimed in any preceding claim, wherein the machine is operable to determine on a random or pseudo-random basis the number of symbols which are selected from at least one of the sets.

5. A machine as claimed in any preceding claim, the machine having a fixed display of said symbols, and means for indicating those symbols on the display which have been selected.

6. A machine as claimed in any preceding claim, wherein the machine is operable to make an initial selection of symbols and then to permit the player to vary the selection in order to attempt to achieve

selection of a winning combination.

7. A machine as claimed in claim 6, wherein the player is allowed to perform a nudging operation whereby the or each selected symbol in a set ceases to be selected and a symbol adjacent thereto within the set is selected instead.

8. A machine as claimed in claim 7, wherein the machine is arranged to allow the user to select which of the sets of symbols a nudging operation is to be performed on.

9. A machine as claimed in any one of claims 1 to 5, wherein the machine is arranged to select symbols in a sequence, and has means permitting the user to halt the sequential selection.

10. A machine as claimed in any preceding claim, wherein the game is an ancillary game, the machine also being arranged to permit the playing of a different, main game.

11. A machine as claimed in claim 10, wherein the machine has mechanical or simulated symbol-carrying reels for use during the playing of the main game.

12. A machine as claimed in claim 10 or claim 11, wherein the machine is arranged to allow the playing of the ancillary game at random or pseudo-random occasions during the playing of a succession of main games.

13. A gaming machine substantially as herein described with reference to the accompanying drawings.